

CLAIMS

What is claimed is:

1. A method for forming a coated prepreg comprising applying a solventless hot-melt resin system with high thermal conductivity ($>2 \text{ W/m}^\circ\text{K}$) to a prepreg by means of a slot die extrusion head.
2. The method of claim 1 further comprising:
heating the resin system a hot-melt dispensing system;
pumping the resin system into a precision machined manifold;
extruding the resin system through a thin opening (slot die) in the manifold and onto the prepreg while controlling the relative movement between the manifold and the prepreg such that the prepreg moves past the opening of the slot die in a manner allowing the dielectric material to flow and coat the surface of the moving prepreg while the volume of material dispensed onto the prepreg is controlled by the pump speed, the die width (slot width), and line speed to place a precise amount of dielectric resin on the prepreg.
3. The method of claim 2 wherein a heated roller is applied to the surface of the coated prepreg formed by the extruded dielectric with slight pressure to achieve a uniform thickness of dielectric across the coated prepreg.
4. The method of claim 2 wherein, after the dielectric is applied and leveled, the moving web is passed through a heated oven to lower the viscosity at least in part by allowing air bubbles to escape and causing the resin to partially cure.
5. The method of claim 4 comprising additional curing without air drying to reduce the tackiness of the dielectric.
6. The method of claim 5 wherein the coated prepreg is subsequently stacked stacked in a lamination layup.

7. The method of claim 2 wherein an infrared (IR) heating source and/or a hot air source is used to heat the liquid resin system and cause a partial cure.
8. The method of claim 2 wherein the resin system is a solventless thermosetting resin the has a thermal conductivity in the range of 0.2-1 W/m-°K.
9. The method of claim 2 wherein the resin system is not fully cured until it is included in a subsequent lamination process used to incorporate the coated prepreg into a multilayer structure.
10. The method of claim 2 wherein coating resin consists of a solventless formulation of epoxy resins, curing agents, accelerators, and fillers.
11. The method of claim 2 wherein the coating resin is a thermosetting resins.
12. The method of claim 11 wherein the coating resin is a cyanate ester or a polyimide.
13. The method of claim 2 wherein a curing agent is used to help crosslink and form the desired network structure to achieves a desired glass transition temperature (T_g).
14. A method of forming multilayer circuit boards with enhanced heat spreading performance without increasing the overall board thickness.
15. A prepreg formed according to the method of claim 1.
16. A multilayer circuit board comprising the prepreg of claim 15.